ductive systems and embryology. The author has wisely chosen to describe only the general features of the muscular system; a more detailed account would have been beyond the scope of the present memoir. The ventral tube, characteristic of Collembola, present as a papilliform organ on the mid-ventral aspect of the first abdominal segment, is formed, as is shown by development, by the fusion of a pair of appendages. The various functions which have been ascribed to this organ are set forth. The author records his observations in support of the view that its primary function is that of an organ of adhesion, but he also believes that it plays an important part as a respiratory organ, in virtue of the ease with which blood flows into it and distends its two terminal thin-walled vesicles. He confirms on Anurida the observations of Willem and Hoffmann on other Collembola, that the secretions of two pairs of cephalic glands flow into a ventral groove leading from the head to the ventral tube, which they serve to moisten. In the chapters on the general structure, classification and affinities of the Collembola, the author concludes that there are no grounds for regarding these animals as degenerate; they show affinities with the Thysanura (especially in having a pair of mouth appendages—the maxillulæ—intercalated between the mandibles and first maxillæ), and, by reason of certain generalised features, to the lower Arthropoda. The memoir also contains additional remarks on other marine insects, and an extensive bibliography relating to papers on the Collembola published since Lord Avebury's monograph.

(2) In selecting *Ligia oceanica* for description as a type of the Isopoda, Mr. Hewitt has made an excellent choice, for not only is this the largest British Isopod, but it is intermediate between the aquatic and terrestrial forms. Although specimens are usually found just above high-water mark, in deep cervices of rocks or quay-walls, the author found them at St. Kilda on the top of a hill 450 feet above sea-level, to which altitude the sea-spray often reaches. It was remarkable that most of the examples found at this height were females, which do not descend to sea-level to feed, but probably do so when liberating the young from their brood-pouches, for large numbers of young individuals were found under the rocks between tide-marks, but none at the high level. Following the description of the habits are clear and concise accounts of the external characters, the various systems of organs, and the development. The eyes are described in some detail. In each ommatidium there are two cone-cells, each of which secretes a hemispherical, transparent mass. These two masses, with their flat sides apposed, form the cone on the proximal side of which the cone-cells further produce two 'sub-cylindrical accessory cones, an interesting and exceptional feature of the eye of Ligia.

(3) The present volume on *Antedon bifida* is Mr. Chadwick's second contribution to this series of memoirs, his previous one, on Echinus, having been published in 1900. Detailed and useful descriptions, with excellent figures, are given of the various parts of the skeleton and of the three nervous systems and their functions. The other systems of organs and the development are well treated. The author is inclined, but without giving reasons, to regard the sacculi as excretory structures; he holds that the view that they consist of reserve material for use in the regeneration of lost or injured parts is discounted by the fact that sacculi are not present in the allied genus Actinometra, in which, nevertheless, regeneration proceeds quite as actively as in Antedon. The account of the axial organ contains no discussion of the many functions which have been ascribed to it, but the author has observed that, at the breeding season, the epithelial cells lining the tubules of the organ break away and become amœboid, suggesting that at this period, at any rate, the axial organ is a site of formation of amœbocytes.

J. H. A.

A LIFE OF SIR WILLIAM FLOWER.

Sir William Flower. By R. Lydekker, F.R.S. Pp. vii+191. (English Men of Science Series.) (London: J. M. Dent and Co., 1906.) Price 2*s.* 6*d.* net.

IT will be long ere the name of William Henry Flower is forgotten by those in this country who are interested in scientific zoology and in the progress and development of zoological museums; and the sketch of his life and work which Mr. Lydekker has put together in the present volume, a small one indeed, though rich in interesting material, will be much valued by those especially who had the advantage of personal acquaintance with the great museum conservator.

As Mr. Lydekker has indicated in his preface, the present work is more devoted to the scientific than to the personal and social side of Sir William Flower's career. Nevertheless, the opening chapter deals with his birth, parentage, education, marriage, general career, and with his lamented death at the age of sixty-seven, in a manner which is both sympathetic and interesting. The remaining seven chapters are devoted to his work as a scientific worker and as a museum conservator or director, and the value of the work which he performed in both capacities is well brought out by the writer of the memoir.

As all zootomists know, Sir William Flower's original work lay almost entirely in the domain of mammalian anatomy and general classification of mammals, and his name will go down to posterity as the discoverer of many new and important facts, and as the propounder of more satisfactory views on many matters of zoological interest. We need only mention his demolition of Owen's classification of mammalia by their brains; his discovery of the fact that in the marsupial dentition only a single pair of teeth on each side is replaced by vertical succession; or his classification of the carnivorous mammalia according to the characters of the base of the cranium. Everyone knows also that Sir William Flower was a first-class authority on the Cetacea, and that in his later years he devoted much attention to anthropological studies.

In the chapters on Sir William's work as conservator of the museum of the Royal College of Surgeons, as director of the Natural History Museum, and on his

© 1907 Nature Publishing Group

museum and miscellaneous work, Mr. Lydekker gives a very clear account of the principles on which that work was guided and of the results achieved. The main lines along which Sir William's ideas of the purpose of museums and of their arrangement ran must be approved by all interested in the subject, although as to some matters of detail there may be room for individual differences of opinion. There can be no doubt of the soundness of the principle that the specimens exhibited in the galleries should, so far as possible, form a distinct collection adapted specially to its purpose of instructing the general public, that old and bad taxidermy should disappear from the cases, that specimens should not be crowded together, but that each should be exhibited with a purpose, instructively or "descriptively" labelled, and placed so that it can be properly seen. How far, however, the principle of making such a popular series rather a collection of "labels illustrated by specimens" than a collection of specimens explained by labels should be carried out is a question which it would be out of place to discuss in a notice like the present, as is also the question as to how far "pictorial mounting" ought to be adopted in natural history museums

Sir William Flower was a strenuous opponent of the unnatural divorce between recent biology and palæontology. Everyone agrees with him now—theoretically—but how many zoologists will take the trouble to look up and read an original palæontological memoir? If they want information on a fossil subject, do they not usually take it and quote it from some text-book at second hand?

In compiling this memoir Mr. Lydekker has done his work sympathetically and well, and has produced a little volume which is worthy of a place on the book-shelves of all British naturalists. R. H. T.

OUR BOOK SHELF.

Sfere cosmografiche e loro applicazione alla risoluzione di Problemi di Geographia Matematica. By Prof. Angelo L. Andreini. Pp. xxix+326. (Milano: Ulrico Hoepli, 1907.) Price 2 lire.

THIS little book, as its title implies, shows how a class of simple problems in spherical trigonometry can be solved with approximation by mechanical methods. It is a form of exercise which has fallen into disrepute in this country, but practical computers will admit that there are times when an appeal to the globe is not without its uses. Such cases can occur in the transformation of coordinates, when the conditions of the problem make the choice of a quadrant uncertain. The author, however, is not so much concerned in providing assistance for the expert as in instructing the novice.

After tracing the history of globe construction and showing some forms of orrery which explain the motion of superior and inferior planets, the phases of the moon, &c., the author indicates the principal problems for which mechanical solution is possible. Very considerable ingenuity is exhibited in the choice and variety of problems submitted, and by some simple additional apparatus for measuring angles an approach to accuracy is made. In those problems connected with the diurnal rotation of the earth, the latitude of a place is determined by measurements made on the prime vertical, while in those depending upon the annual revolution about the sun the equation of time and the obliquity of the ecliptic find a place. This will give some idea of the range of subjects for which the author finds application. Indeed, not a little of the interest of the book centres in its completeness. We should imagine that no class of problems to which a globe has ever been applied is entirely unrepresented here. As a matter of fact, there is reference to the tides and the establishment of a port, though it is difficult to see how a globe can give any assistance in such matters. A large number of examples are given to be worked by the student, and in another section the manner of solution is indicated.

Electric Light and Power. By E. E. Brooks and W. H. N. James. Pp. viii+372. (London: Methuen and Co., n.d.) Price 4*s*. 6*d*.

THE best that can be said of this text-book is that it is neither better nor worse than others of its class. The book is apparently intended as a first-year course for students of not very high scholastic attainments; if this is so, we think it covers too much ground. Starting from the very beginning, with experiments with knitting needles, the student is led to the consideration of dynamos, alternators, and motors. Then follow a couple of chapters on lighting circuits and lamps, a chapter on measuring instruments, and finally one on primary cells and accumulators. We doubt if any student can properly master all this material in a preliminary course. In any case, we are strongly of opinion that it is inadvisable that he should try to do so.

Much has been spoken and written on the question of the interconnection between teaching and manufacturing. We cannot forbear quoting one instance from this book, which shows how desirable closer sympathy is. After a very inadequate description of primary batteries, the authors write in reference to the dry cell:—"Economy in first cost is attained in various ways. For instance, a cell recently examined was found to have a solid block of wood nearly three inches thick between the bottom of the cardboard case and the bottom of the zinc cell." It is nothing short of a travesty of teaching to devote even four lines in a text-book, where space is only too valuable, to conveying this sort of information. The authors must have forgotten the excellent definition of an engineer as one who can do for a dollar what any fool can do for five. We pity the young engineer, nourished on this food, who, when asked by his employer to endeavour to reduce first cost, comes forward with a suggestion of this kind. M. S.

L'Hygiène moderne. By Dr. J. Héricourt. Pp. 311. (Paris: Ernest Flammarion, 1907.) Price 3·50 francs.

THIS book surveys, in an interesting, readable, and non-technical manner, modern views on hygiene. It is divided into four sections—hygiene of the individual, which includes predisposition, tuberculosis, diet, clothing, exercise, and infantile mortality; hygiene of the home, which includes the house and domestic life; hygiene of communities, schools, &c.; and public hygiene, including that of public vehicles, streets, domestic animals, &c. One of the earlier chapters on the arthritic diathesis would be better suited, perhaps, to a medical text-book, and the author seems to be one of those who hold extreme views on the evils of uric acid. On the question of alcohol, the author believes that good wine or spirit in moderation does no harm, and in many cases is beneficial. The kissing of children is rightly condemned, and the condition of the public streets, with their dust, dirt, and spitting, is characterised as a "hygienic scandal." R. T. H.

© 1907 Nature Publishing Group